

Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

Claim Rejections - 35 U.S.C. § 112, first paragraph

Claims 1-11 and 40 have been rejected under 35 U.S.C. § 112, first paragraph. The Examiner contends that the phrase "without tuning of the discrete phase shift" was not described in the application. Claim 1 has been amended to recite that "the grating structure is formed without introducing a phase shift by post processing of the grating structure."

This phrase is intended to be consistent with the suggestion of the Examiner for reciting claim features that will serve to overcome art rejections. Those art rejections are more fully discussed below. Support for the amendment suggested by the Examiner is present as a combination of the third paragraph of the specification (page 1, lines 17-22) and the last paragraph of the specification (page 8, lines 20-29). Reading these passages, it is clear that page 1, lines 17-22 describes how phase shifts are conventionally achieved by post processing and the disadvantage thereof. At page 8, lines 20-29, among other locations, the specification clearly sets forth that the claimed optical fiber laser features are achieved using the claimed method steps. Accordingly, one fabricating a laser using the claimed process would not need post processing to introduce the claimed phase shift. As a result, the claim language, while broader than that proposed by the Examiner, is fully supported by the application and withdrawal of the rejection under 35 U.S.C. § 112, first paragraph, is requested.

Claim Rejections - 35 U.S.C. § 102 and § 103

Claims 27-29, 31, 32, 34 and 39 have been rejected under 35 U.S.C. § 102(b) over Storoy et al., "Single Polarization Fibre DFB Laser," Electron. Lett., Vol. 33(1) (1,1997) or, alternatively, under 35 U.S.C. § 103(a) over Storoy in view of Erdogan et al, "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers." JOSA B Vol. 11(10), pp. 2100-2105 (10/1994).

While independent claim 27 uses the transition clause "consisting of the step of" (a closed-ended transition clause as opposed to an opened transition clause that uses the term "comprising") to exclude prior art that uses processing steps in addition to the recited acts from anticipating or rendering obvious the subject matter of claim 27, claim

27 has been amended to recite that "the grating structure is formed without introducing a phase shift by post processing of the grating structure."

The amendment to claim 27 is consistent with the suggestion of the Examiner. In particular, at page 6 of the Office Action, the Examiner indicated that these rejections could be obviated by 1) incorporating a detailed description from GB 2316760 (also identifiable as GB 9617688.8) in place of the reference in the application at page 4, lines 27-29; and 2) inserting suggested subject matter in the claims.

With respect to the first item (incorporating a description from GB 2316760), the undersigned respectfully points out that the subject matter was incorporated by amendment in the Reply to Office Action Dated September 3, 2003 (mailed to the Office on December 3, 2003). The Examiner has indicated at page 2 of the Office Action dated March 10, 2004 that this subject matter was incorporated into the specification without adding new matter. Accordingly, it is submitted that the first item is satisfied.

With respect to the second item, the Examiner indicates that there is no motivation in the prior art to fabricate an optical fiber laser without a post processing step to tune the phase shift. Since claim 27 recites that the grating structure is form without introducing a phase shift by post processing of the grating structure, it can be concluded that claim 27 and the claims depending therefrom recite allowable subject matter. Accordingly, withdrawal of the rejections of 27-29, 31, 32, 34 and 39 is requested.

Claims 27-32, 34-37 and 39 have been rejected under 35 U.S.C. § 103(a) over Storoy alone or in combination with Erdogan in view of U.S. Patent No. 5,956,442 to Byron. The Examiner indicated that the above-described amendment to claim 27 would obviate the rejection of Storoy taken alone or rejections that "depend" on the combination of Storoy and Erdogan. In addition, even though Byron teaches straining the fiber during writing of a chirped Bragg reflection grating, Byron does not teach or suggest at least the aspects added to claim 27 consistent with the suggestion of the Examiner or the closed-ended process recited in claim 27. Therefore, even if one were to make the proposed combination, the claimed invention would not result. Furthermore, only dependent claims 34-35 recite that the fiber is stressed, but other claims have been rejected over the proposed combination.

Claims 27-37 and 39 have been rejected under 35 U.S.C. § 103(a) over Storoy alone or combined with Erdogan in view of Byron and further in view of U.S. Patent No. 5,881,197 to Dong. The Examiner indicated that the above-described amendments

would obviate the rejection of Storoy taken alone or rejections that "depend" on the combination of Storoy and Erdogan. In addition, even though Dong compares Yb/Er doped fibers and Er only doped fibers, Dong also indicates at column 2, lines 12-17 that Yb/Er fibers have the disadvantage that useable grating can only be written with hydrogenation. In this passage Dong goes on to state that the hydrogenation makes writing more difficult and reduces laser efficiency. Accordingly, it is submitted that Dong teaches away from Yb/Er doped fibers. Nor does Dong teach or suggest at least the aspects added to claim 27 consistent with the suggestion of the Examiner or the closed-ended process recited in claim 27. Therefore, motivation to combine Dong with the other reference is lacking since Dong teaches away from Yb/Er doped fibers and even if one were to make the proposed combination, the claimed invention would not result. Furthermore, only claim 33 recites a fiber doped with these elements, but other claims have been rejected over the proposed combination.

Claims 1-6, 8, 10-11, 27-31, 32, 34 and 36-40 have been rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,363,239 to Mizrahi and Storoy. Mizrahi does not cure the above-noted deficiencies in the teachings of Storoy since Mizrahi fails to teach or reasonably suggest claimed aspects of the grating structure once written or the recited process steps. While Mizrahi does describe a method of writing gratings using multiple exposures, Mizrahi does not disclose the resulting claimed aspects of an optical fiber laser where the induced grating structure has a different grating strength for two orthogonal polarization modes with a substantially identical discrete phase shift for the two orthogonal polarization modes. Referring to the abstract of Mizrahi at lines 6 to 8, column 1, lines 7-12 and column 3, lines 40-48, Mizrahi relates to passive optical components, namely gratings without phase shifts. Further, Mizrahi does not disclose the claimed polarization of the writing light beam. Therefore, even if one were to combine the references in the proposed manner, unmotivated steps, including perhaps post processing to introduce a phase shift, would be needed to construct the optical laser having the claimed features and the claimed method of fabricating an optical fiber laser would not result.

Claims 1-6, 8-11, 27-32 and 34-40 have been rejected under 35 U.S.C. § 103(a) over Mizrahi and Storoy, further in view of Byron. Also, claims 1-11 and 27-40 have been rejected under 35 U.S.C. § 103(a) over Mizrahi and Storoy, further in view of Byron and Dong. The deficiencies in the teachings of Byron and Dong are noted above. The addition of Byron, or Byron and Dong, to the teachings of Mizrahi and/or Storoy does not arrive at the claimed subject matter. Any combination of these references, at a minimum, would lack the properties of the optical fiber laser fabricated with a method where the grating structure is formed without introducing a phase shift by post processing of the grating structure.

In view of the foregoing, reconsideration and withdrawal of the rejections under 35 U.S.C. §§ 102-103 is respectfully requested.

Conclusion

In view of the foregoing, request is made for timely issuance of a notice of allowance.

Respectfully submitted,

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